[0095] From the preceding results, it can be seen that the method of the present invention is highly effective at agglomerating alumina particles into micro-agglomerates of appropriate size and resistance to attrition to be incorporated into smelting grade alumina. This is achieved using levels of binder much lower than that utilised in the prior art, affording cost savings and industrial hygiene benefits.

[0096] It is envisaged that a catalyst metal may be added to the slurry to produce a high surface area catalyst product on an alumina binder.

[0097] Modifications and variations such as would be apparent to the skilled addressee are considered to fall within the scope of the present invention.

[0098] What is claimed is:

1. A method for the agglomeration of alumina particles, the method characterized by the steps of:

(a) adding a quantity of pseudo-boehmite to a plurality of alumina particles, thereby to form a mixture, and

(b) spray drying the mixture to produce agglomerated granules.

2. A method according to claim 1 characterized in that the pseudo-boehmite is added as an aqueous suspension.

3. A method according to claim 2 characterized in that the aqueous suspension of pseudo-boehmite is formed at a temperature between about 15 and 100°C.

4. A method according to claim 2 or 3 characterized in that the aqueous suspension of pseudo-boehmite is formed at a temperature above about 80°C.

5. A method according to claim 2 characterized in that the aqueous suspension of pseudo-boehmite is formed at a temperature above about 85°C.

6. A method according to any of claims 2 to 5 characterized in that a quantity of acid is added to the aqueous suspension of pseudo-boehmite such that the pH of the suspension is between about 2 and 6.

7. A method according to claim 6 characterized in that a quantity of acid is added to the aqueous suspension of pseudo-boehmite such that the pH of the suspension is approximately 3.

8. A method according to claim 6 or 7 characterized in that the acid is monoprotic.

9. A method according to claim 8 characterized in that the acid is acetic acid.

10. A method according to any of the preceding claims characterized in that, before the step of adding a quantity of pseudo-boehmite to the alumina particles, the alumina particles are comminuted to a D_{50} of less than 12 µm.

11. A method according to claim 10 characterized in that the alumina particles are comminuted to a D_{50} of less than about 9 µm.

12. A method according to claim 11 characterized in that before step (a), the alumina particles are communited to a D_{50} of about 5 µm.

13. A method according to any one of the preceding claims characterized in that a quantity of water is added to the alumina particles to form a slurry, the particles in the slurry then being subjected to grinding.

14. A method according to any one of claims 1 to 12 characterized in that the alumina particles are subjected to dry grinding before a quantity of water is added to form a slurry.

15. A method according to claim 14 characterized in that the quantity of water is provided by way of an aqueous suspension of pseudo-boehmite.

16. A method according to any one of claims 13 to 15 characterized in that the slurry is of high density.

17. A method according to claim 16 characterized in that the slurry comprises at least aboout 50% solids.

18. A method according to claim 16 characterized in that the slurry comprises between about 40 and 60% solids.

19. A method according to any one of claims 13 to 18 characterized in that a viscosity modifier is added to the slurry.

20. A method according to claim 19 characterized in that the viscosity modifier contains one or more of acetic acid, citric acid or a polyacrylate.

21. A method according to claim 19 characterized in that the viscosity modifier is added such that the viscosity of the slurry is less than about 4 cp.

22. A method according to any one of claims 19 to 21 characterized in that the viscosity modifier is acetic acid.

23. A method according to claim 22 characterized in that sufficient acetic acid is introduced such that the concentration of the acetic acid in the slurry is between about 0.2 and 1.5% by weight of the alumina particles.

24. A method according to any one of the preceding claims characterized in that before the quantity of pseudo-boehmite is added to the alumina particles, the method comprises the additional steps of neutralizing, dewatering and washing the alumina particles.

25. A method according to claim 24 characterized in that dewatering is achieved by way of filtration.

26. A method according to claim 24 characterized in that dewatering is achieved by way of centrifugation.

27. A method according to any one of claims 24 to 26 characterized in that carbon dioxide neutralizes the alumina particles.

28. A method according to any one of claims 24 to 27 characterized in that the step of neutralizing, dewatering and washing the alumina particles is carried out before grinding the alumina particles.

29. A method according to any one of the preceding claims characterized by the step of heating the agglomerated granules.

30. A method according to claim 29 characterized in that the agglomerated particles are dehydroxylated by heating to approximately 300°C.

31. A method according to claim 29 characterized in that the agglomerated granules are calcined above 500°C.

32. A method according to claim 1 wherein the quantity of pseudo-boehmite is at least about 0.8 wt%, based on weight of the mixture.

33. A method according to any of the preceding claims wherein the agglomerated granules have a D_{50} in the range of about 150 to 300 µm.

34. Agglomerated granules produced by the method of any one of claims 1 to 33.